

6. (a) The mean life time of sample of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with standard deviation of 120 hours. The company claims that the average life time of the bulbs produced by it is 1600 hours. Using the level of significance of 0.05 is the claim acceptable. **5**
- (b) An I.Q. test was administrated to 5 persons before and after they are trained. The results are given below :

Candidates	I.Q. before	I.Q. after
	Training	Training
A	110	120
B	120	118
C	123	125
D	132	136
E	125	121

Test whether there is any change is I.Q. after the training. It is given that $t_{0.1} = 4.6$ for 4 d.f.

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B.Tech. EXAMINATION, 2022

Semester III (CBCS)

PROBABILITY AND STATISTICS

(Common for B.Tech. all Branches)

MA-301

Time : 3 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (a) A bag contains 5 red and 3 green balls while a second bag contains 3 red and 5 green balls. One ball is drawn from the first bag and two

from the second bag. Find the probability that of the three balls drawn, two are red and one is green. 5

(b) Bag I contains 4 white balls and 2 black balls, while Bag II contains 3 white balls and 3 black balls. Two balls are drawn (without replacement) at random from one of the bags and were found to be one white and one black. Find the probability that the balls were drawn from Bag II. 5

2. (a) An urn contains 4 white and 6 red balls. Four balls are drawn at random from the urn. Find the probability distribution of the number of white balls. 5

(b) Two cards are drawn successively with replacement from a well shuffled pack of 52 cards. Find the mean and standard deviation of the number of kings. 5

Section B

3. (a) Write a short note on Poisson probability distribution. 5

(b) If X is a Poisson variable such that $P(x = 2) = 9P(x = 4) + 90P(x = 6)$, find the mean and variance of X . 5

4. (a) What is the probability of guessing correctly at least six of the ten answers in a True-False objective test ? 5

(b) An urn contains 3 white balls and 6 red balls. Four balls are drawn one by one with replacement from the urn. Find the probability distribution of the number of red balls drawn. Also, find mean and variance of the distribution. 5

Section C

5. (a) What are merits and demerits of simple random sampling ? 5

(b) In a random selection of 64 of 600 road crossing in a town, the mean number of automobile accidents per year was found to be 4.2 and the sample standard deviation was 0.8. Construct a 95% confidence interval for the mean number of automobile accidents per crossing per year. 5